

**CLAIMS:**

1. An ultrasonic transmitting and receiving apparatus comprising:
  - an ultrasonic transducer array including a plurality of ultrasonic transducers arranged in a matrix form;
  - 5 waveform information setting means for setting waveform information to be used for transmitting a plurality of ultrasonic beams, each of which is synthesized by a plurality of ultrasonic signals having amplitude and phase
  - 10 characteristics represented by Bessel function, within a predetermined period; and
  - drive signal generating means for generating a plurality of drive signals for respectively driving said plurality of ultrasonic transducers included in said ultrasonic transducer array on the basis of the waveform information set by said waveform information setting means.
2. The ultrasonic transmitting receiving apparatus according to claim 1, wherein said waveform information setting means sets said waveform information so that said plurality of ultrasonic beams are transmitted from different areas included in said ultrasonic transducer array, respectively.
3. The ultrasonic transmitting receiving apparatus according to claim 1, wherein said waveform information setting means sets said waveform information so that said plurality of ultrasonic beams are transmitted from the same area included in said ultrasonic transducer array.

4. The ultrasonic transmitting receiving apparatus according to claim 1, further comprising:

delay time setting means for setting delay time of the ultrasonic signals in said drive signal generating means so  
5 that said plurality of ultrasonic beams are steered; and  
image generating means for generating an ultrasonic image on the basis of detection signals obtained by receiving ultrasonic echoes.

5. The ultrasonic transmitting receiving apparatus  
10 according to claim 2, further comprising:

delay time setting means for setting delay time of the ultrasonic signals in said drive signal generating means so that said plurality of ultrasonic beams are steered; and  
image generating means for generating an ultrasonic image on the basis of detection signals obtained by receiving  
15 ultrasonic echoes.

6. The ultrasonic transmitting receiving apparatus according to claim 3, further comprising:

delay time setting means for setting delay time of the  
20 ultrasonic signals in said drive signal generating means so that said plurality of ultrasonic beams are steered; and  
image generating means for generating an ultrasonic image on the basis of detection signals obtained by receiving ultrasonic echoes.

25 7. The ultrasonic transmitting receiving apparatus according to claim 1, further comprising:

control means for controlling at least one of a position

of said ultrasonic transducer array and an orientation of  
an aperture thereof; and

image generating means for generating an ultrasonic  
image on the basis of detection signals obtained by receiving  
5 ultrasonic echoes.

8. The ultrasonic transmitting receiving apparatus  
according to claim 2, further comprising:

control means for controlling at least one of a position  
of said ultrasonic transducer array and an orientation of  
10 an aperture thereof; and

image generating means for generating an ultrasonic  
image on the basis of detection signals obtained by receiving  
ultrasonic echoes.

9. The ultrasonic transmitting receiving apparatus  
15 according to claim 3, further comprising:

control means for controlling at least one of a position  
of said ultrasonic transducer array and an orientation of  
an aperture thereof; and

image generating means for generating an ultrasonic  
20 image on the basis of detection signals obtained by receiving  
ultrasonic echoes.